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ECONOMIC ASPECTS OF THE FRESH PLUM INDUSTRY

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ECONOMIC ASPECTS OF THE FRESH PLUM INDUSTRY¹

EMIL RAUCHENSTEIN²

SUMMARY AND CONCLUSIONS

Plums rank fourteenth in value among California fruits and thirteenth in bearing acreage. Their value is 3 per cent of that of the orange crop—the crop having the highest value—and the bearing acreage occupied is 10 per cent of the raisin-grape acreage—the crop having the largest acreage.

Plum trees are widely distributed throughout the United States, but only the three Pacific Coast states and Idaho produce many that enter commercial channels. More than one-half of the plum shipments come from California, and the proportion as well as the amount is increasing. One-half of the bearing plum acreage in California in 1927 was in the four contiguous counties, Placer, Sacramento, Solano, and San Joaquin. Increases have been very rapid in Tulare and Fresno counties which, in the same year, made up approximately one-fourth of the acreage in the state. From 1921 to 1927 the bearing acreage of plums in California increased from 19,715 to 33,827, an increase of 72 per cent. A bearing acreage of 38,800 is estimated for 1930.

Interstate shipments of plums from California increased from 465 carlots in 1895 to more than 5,000 in 1923 and 1926. On an average each year the shipments were 6.624 per cent greater than the preceding year. Most of the plums in the United States shipped during June and July come from California. In August and September the bulk of the plums come from Oregon, Washington, and Idaho. Carlot shipments of mixed deciduous fruits, apples, pears, cantaloupes, and peaches in the United States during June, July, and August have increased rapidly from 1920 to 1927. Plums make up but a small

¹ Economic aspects of the dried-prune industry are considered in a separate study by Dr. S. W. Shear of the Division of Agricultural Economics, to whom the author is particularly indebted for considerable of the data on plum prices and quantities sold used in the present study. Assistance in statistical computations was rendered by Miss Gladys E. Platts, statistical clerk, and Mr. George L. Horenstein, student assistant.

² Associate Agricultural Economist in Experiment Station.

proportion of the shipments of all of these fruits, averaging approximately 7.0 per cent of the total in June, 3.5 per cent in July, and 4.0 per cent in August.

Nearly all plums are consumed in the fresh state. Only 4 to 8 per cent are canned, the bulk of which come from California.

The early California plums usually bring high prices in New York when they first come on the market. As the supplies increase prices rapidly decline. The later varieties bring some recovery in prices, especially when the supplies become limited towards the end of the season. The varieties bringing the highest prices at New York from 1925 to 1927 were Kelsey, Wickson, President, Beauty, and Formosa. The Diamond and Tragedy rank high among those on which complete records are available since 1917. In selecting varieties for planting, however, it should be noted that there are considerable variations from year to year in the rank held by the different varieties, and further, that other factors such as adaptability of the variety to the region, cost of production per crate, the problem of pollination, and labor distribution, must be considered as well as the price the variety is likely to bring.

The average annual price of California plums on the New York market is largely affected by the quantities sold. Large quantities generally bring low prices and small quantities high prices. To a considerable extent this also holds for the individual varieties. The trend in prices (adjusted for changes in price level) has been approximately on a level since 1920. The trend in quantities sold has been upward. Since shipments of other fruits as well as plums are increasing rapidly, prices in the future are not likely to average higher than those obtained since 1920. Of course the fact that plums make up but a small part of the total fruit supply available during the summer may lead some growers to conclude that even a marked increase in the supply of plums would not have a noticeable effect on price. Preliminary studies, however, indicate that plum prices are affected much more by the quantities of plums coming onto the market than by the quantities of other fruits available.

OBJECT OF THIS STUDY

The object of this study is to present and to analyze the available data on plum production, crop movement, relation to other fruits, utilization, and the relationship between supply and price, in order to obtain some basis for judging the economic outlook for the industry.

THE IMPORTANCE OF THE PLUM INDUSTRY IN CALIFORNIA

The average farm value of the plum crop in California for the years 1926 and 1927 (see table 1) was \$2,170,000 or fourteenth in the list of California fruits. The orange crop leads the list with a

TABLE 1
VALUE OF FRUIT CROPS IN CALIFORNIA*
(Average of 1926 and 1927)

Rank	Crop	Value (in thousands of dollars) (Dec. 1)	Per cent of value of oranges
1	Oranges.....	77,047	100
2	Wine grapes.....	19,958	26
3	Lemons.....	19,636	25
4	Raisins (dried).....	19,495	25
5	Peaches.....	15,887	21
6	Nuts (almonds and walnuts).....	15,480	20
7	Prunes.....	14,150	18
8	Apricots.....	10,788	14
9	Table grapes.....	9,312	12
10	Pears.....	8,375	11
11	Raisins (marketed fresh).....	5,775	7
12	Apples.....	5,426	7
13	Cherries.....	2,880	4
14	Plums.....	2,170	3
15	Olives.....	1,080	1
16	Figs.....	734	1

* Data from California cooperative crop reporting service. California Annual Crop Report 1927, p. 3 (mimeograph), January 4, 1928.

TABLE 2
ESTIMATED BEARING ACREAGES OF FRUIT CROPS IN CALIFORNIA, 1927

Rank	Crop	Acreage	Per cent of raisin grape acreage
1	Raisin grapes.....	349,660	100
2	Oranges.....	185,543	53
3	Wine grapes.....	166,864	48
4	Prunes.....	165,199	47
5	Nuts.....	161,797	46
6	Peaches.....	150,822	43
7	Table grapes.....	145,580	42
8	Apricots.....	80,724	23
9	Pears.....	58,138	17
10	Apples.....	55,325	16
11	Figs.....	45,132	13
12	Lemons.....	43,179	12
13	Plums.....	33,827	10
14	Olives.....	24,670	7
15	Cherries.....	12,593	4

Data from Kaufman, E. E., California crop report for 1926. California Dept. Agr. Spec. Pub. 74:26. 1927.

a value of \$77,047,000 and wine grapes are second with a value of \$19,958,000. Hence the plum crop was 3 per cent as valuable as the orange crop, and 11 per cent as valuable as wine grapes.

Comparisons on the basis of bearing acreage for 1927 are shown in table 2. Here plums rank thirteenth in the list of California fruits. Raisin grapes lead the list with 349,660 acres, while oranges are second with 185,543 acres. Plums comprise 33,827 acres, or 10 per cent of the raisin-grape acreage.

DISTRIBUTION OF PLUM TREES IN THE UNITED STATES

Plums are probably the most widely distributed tree fruit in the United States. Some of the native varieties are exceedingly resistant to cold and drought. These hardy native varieties, however, do not enter into commercial channels to any great extent, but are of considerable importance in home consumption. Those varieties which attain larger size and possess finer dessert qualities enter into commercial channels. More than half of these are grown in California, where the climate is less severe than in the north central and north Atlantic states.

The distribution of plum trees in the United States for the years 1910, 1920, and 1925 is shown by states and sections in table 3. The United States Census combines plums with prunes regardless of whether the fruit is used fresh or dried. However, since California, Oregon, and Washington are the only states which dry any considerable quantities of prunes, the data on plums as given in table 3 have not been changed from those given in the United States Census except in the case of the three Pacific Coast states. For these states estimates have been made from the state data on production and acreages of plums and prunes so as to obtain figures comparable with those given for the rest of the United States. The methods used in making those estimates are explained in the footnote to table 3. The estimates must be considered only as preliminary for Oregon and Washington, subject to correction as soon as a more accurate basis can be obtained for making these estimates.

In a general way the distribution of plum trees in the United States outside of California resembles that of apple trees.³ The number of plum trees, however, is approximately only one-tenth as great as the number of apple trees and the area devoted to plums is probably less than one-twentieth of the apple area.

³ Rauchenstein, Emil. Economic aspects of the apple industry. California Agr. Exp. Sta. Bul. 445:18, 19. 1927.

TABLE 3

NUMBER OF PLUM TREES, BEARING AND NON-BEARING, IN THE UNITED STATES BY STATES AND SECTIONS, 1910, 1920, AND 1925

(In Thousands)

States and sections	1910	1920	1925
1. New England states:			
Maine.....	66	47	33
New Hampshire.....	36	25	17
Vermont.....	49	30	21
Massachusetts.....	65	49	51
Rhode Island.....	7	3	4
Connecticut.....	43	25	27
Total.....	266	179	153
2. Middle Atlantic states:			
New York.....	1,247	951	975
New Jersey.....	70	42	41
Pennsylvania.....	1,238	1,001	895
Total.....	2,555	1,994	1,911
3. East north central states:			
Ohio.....	1,335	589	588
Indiana.....	745	267	277
Illinois.....	742	353	395
Michigan.....	718	520	565
Wisconsin.....	177	180	250
Total.....	3,717	1,909	2,075
4. West north central states:			
Minnesota.....	402	297	320
Iowa.....	1,400	409	482
Missouri.....	1,102	673	614
North Dakota.....	55	61	69
South Dakota.....	440	177	176
Nebraska.....	535	149	180
Kansas.....	751	212	236
Total.....	4,685	1,978	2,077
5. South Atlantic states:			
Delaware.....	31	7	5
Maryland.....	99	53	51
District of Columbia.....			
Virginia.....	232	154	174
West Virginia.....	360	239	208
North Carolina.....	214	146	156
South Carolina.....	104	65	51
Georgia.....	419	174	220
Florida.....	56	45	82
Total.....	1,515	883	947
6. East south central states:			
Kentucky.....	484	340	254
Tennessee.....	608	329	268
Alabama.....	264	121	99
Mississippi.....	340	99	91
Total.....	1,696	889	712

TABLE 3—(Continued)

States and sections	1910	1920	1925
7. West south central states:			
Arkansas.....	911	363	307
Louisiana.....	191	124	92
Oklahoma.....	632	311	254
Texas.....	1,349	724	630
Total.....	3,083	1,522	1,283
8. Mountain states:			
Montana.....	36	29	19
Idaho.....	401	633	719
Wyoming.....	12	16	12
Colorado.....	212	108	73
New Mexico.....	94	62	56
Arizona.....	20	23	38
Utah.....	159	74	64
Nevada.....	10	7	7
Total.....	944	952	988
9. Pacific states:			
Washington*.....	627	357	404
Oregon*.....	1,009	576	650
California†.....	1,623	2,583	4,339
Total.....	3,259	3,516	5,393
TOTAL UNITED STATES.....	21,720	13,822	15,539

* Data on number of plum trees in Washington and Oregon were obtained by subtracting estimates of the number of prune trees from the totals of plum and prune trees given by the census. Estimates of the number of prune trees were made by taking the data on prune production from U. S. Dept. Agr. Dept. Cir. 416:36, 1927. Critchfield, Burke H. Demand, marketing and production of Oregon and Washington prunes, (with several corrections from the California Fruit News annual statistical numbers), and the data on acreage, calculating the normal trend of production from 1910 to 1926, and assuming the acreage back in 1925, 1920, and 1910 to be in the same ratio to normal production as in 1926. The plum acreage thus calculated was divided between Washington and Oregon in proportion to the fresh plum shipments from these states from 1920 to 1927.

† Data on number of trees for 1920 and 1925 are based on estimated acreages from Kaufman, E. E. California crop report for 1926. California Dept. Agr. Spec. Pub. 74:25, 26, 1927, counting 109 trees to the acre and adding 37 per cent for non-bearing trees. Estimates for 1910 are based on shipment data (table 6) which showed a trend represented by the equation $\log y = 3.209733 + 0.02809z$. Converting this to acreage trend and using the mean of bearing acreages 1914-1926 as the starting point centered at the year 1920 gave $\log y = 4.316997 + 0.02809z$. Conversion to number of trees is then made as for 1920 and 1925.

Data for 1925 compiled from U. S. Census of Agr. 1925:48-51.

Data for 1910 and 1920 compiled from 14th Census of U. S. 5:866. 1920.

The trend in the number of plum trees from 1910 to 1925 in most of the states is similar to the trend in the number of apple trees during the same period. In those states where plums are produced in small farm orchards as a side-line to a general farming business, the number of trees has decreased 50 per cent, in many cases, from 1910 to 1920. From 1920 to 1925 there was little change in most of these states. California and Idaho are the only important plum producing states which showed consistent increases in the number of trees from 1910 to 1925. California had 1,623,000 trees in 1910 and increased them to 4,339,000 in 1925. Idaho had 401,000 trees in 1910 and 719,000 in 1925.

TABLE 4
BEARING ACRES OF PLUMS IN CALIFORNIA, BY COUNTIES, 1921-1927

	1921	1922	1923	1924	1925	1926	1927
District No. 1:							
Del Norte.....							
Humboldt.....	100	100	110	120	130	135	135
Mendocino.....	10	10	10	10	12	17	17
District No. 2:							
Shasta.....	150	150	150	150	150	150	75
Siskiyou.....	10	10	10	10	10	10	10
Trinity.....	7	7	7	7	7	7	7
District No. 3:							
Lassen.....	37	37	37	37	40	10	2
Modoc.....	20	27	27	27	32	13	13
Plumas.....							
District No. 4:							
Alameda.....	200	200	200	200	205	200	200
Contra Costa.....	25	25	25	25	25	25	40
Lake.....							
Marin.....	9	9	9	9	9	9	20
Monterey.....		37	38	40	40	45	45
Napa.....	75	75	75	75	100	100	50
San Benito.....	10	10	10	10	15	20	20
San Luis Obispo.....	60	32	42	53	78	105	147
San Mateo.....	22	22	22	22	22	22	76
Santa Clara.....	400	400	900	1,400	1,400	1,400	1,450
Santa Cruz.....							
Sonoma.....	200	250	300	350	550	550	550
District No. 5:							
Butte.....	117	117	117	117	121	289	280
Colusa.....	23	23	23	23	23	23	23
Glenn.....	8	10	13	15	15	15	18
Sacramento.....	2,394	2,528	2,564	2,600	2,798	2,800	3,050
Solano.....	2,700	3,810	3,810	3,810	3,865	4,270	4,420
Sutter.....	164	170	176	183	228	246	307
Tehama.....	10	10	10	10	25	26	30
Yolo.....	689	900	900	896	1,100	1,175	1,225
Yuba.....	50	50	50	50	50	50	50
District No. 5a:							
Fresno.....	820	1,200	1,309	1,700	2,500	3,000	3,100
Kern.....	78	78	114	150	553	203	1,060
Kings.....	50	50	75	100	100	110	100
Madera.....	108	108	109	110	111	171	315
Merced.....	70	70	92	114	142	203	285
San Joaquin.....	1,212	1,364	1,414	1,464	1,546	1,601	1,752
Stanislaus.....	35	104	114	124	135	133	174
Tulare.....	1,209	1,644	2,037	2,429	3,387	3,387	5,129
District No. 6:							
Alpine.....							
Amador.....	200	210	210	210	220	225	225
Calaveras.....	78	82	82	15	15	17	17
Eldorado.....	400	400	425	450	475	500	450
Inyo.....	10	12	12	12	16	16	16
Mariposa.....	25	27	27	27	27	27	27
Mono.....							
Nevada.....	197	200	212	225	255	265	268
Placer.....	6,769	6,809	6,841	6,873	7,352	7,465	7,512
Sierra.....							
Tuolumne.....		6	6	6	5	5	6

TABLE 4—(Continued)

	1921	1922	1923	1924	1925	1926	1927
District No. 8:							
Imperial.....							
Los Angeles.....	462	663	663	663	676	611	604
Orange.....							
Riverside.....	10	15	20	23	23	23	35
San Bernardino.....	294	131	135	140	161	186	161
San Diego.....	186	229	255	278	273	275	295
Santa Barbara.....				23	20	20	20
Ventura.....	12	13	13	13	13	16	16
State.....	19,715	22,432	23,800	25,398	29,055	30,171	33,827

Data from: California Crop Reporting Service. Estimated bearing acres of plums in California. 1 p. (mimeo.). 1927.

The total number of trees in the United States in 1925 was 15,539,000. Of these California had 4,339,000, or approximately 28 per cent. The middle Atlantic, east north central, and west north central states had approximately 2,000,000 plum trees in each group in 1925. In the west south central states 1,283,000 trees were reported in the 1925 Census. The south Atlantic and mountain states had nearly 1,000,000 trees in each group, and the east south central group had slightly over 700,000.

DISTRIBUTION AND TREND OF BEARING ACREAGE IN CALIFORNIA

During the seven-year period from 1921 to 1927 the bearing acreage of plums in California increased rapidly, as shown in table 4. Beginning with 19,715 acres in 1921 plums increased to 33,827 in 1927, or 72 per cent. The increase was most rapid in Tulare County which increased from 1,209 to 5,129 acres during this period, while Fresno County was next with an increase from 820 to 3,100. Santa Clara County shows a rapid rate of expansion beginning with 400 acres and increasing to 1,450. Placer County had the largest acreage during the whole period ending with 7,512 acres in 1927, an increase of approximately 800 acres in seven years. The four counties, Placer, Sacramento, Solano, and San Joaquin, east and north of Suisun Bay (see figure 1) included approximately 50 per cent of the bearing acreage in California. If we include Tulare and Fresno counties in addition to the previous four counties we have 74 per cent of the total

acreage in the state. Three additional counties, viz., Santa Clara, Yolo, and Kern, have more than 1,000 acres each. The total acreage in these nine counties was 28,698 acres, or 85 per cent of the total.

PLUM BEARING ACREAGE IN CALIFORNIA, 1927



Fig. 1.—One-half of the bearing plum acreage in California is in the four contiguous counties of Placer, Sacramento, Solano, and San Joaquin and one-fourth is in Tulare and Fresno counties. (Data from table 4.)

According to E. E. Kaufman⁴ there will be further increases in acreage for the state as a whole, reaching 38,800 acres in 1930, an increase of 15 per cent above the 1927 acreage.

⁴ From a letter to the writer, dated July 18, 1928.

SHIPMENTS OF PLUMS

Trend in California Shipments.—The growth of the plum industry in California is well shown by the record of interstate carlot shipments from 1895–1926 (see table 5 and figure 2). In 1895 shipments amounted to 465 carlots and in 1926 they amounted to 5,221 carlots.

TABLE 5
INTERSTATE SHIPMENTS OF CALIFORNIA PLUMS, 1895–1927

Year	Shipments* in carlots	Year	Shipments* in carlots	Year	Shipments* in carlots
1895	465	1906	1,220	1917	2,651
1896	407	1907	1,039	1918	2,483
1897	742	1908	1,763	1919	2,918
1898	542	1909	1,527	1920	2,564
1899	885	1910	1,552	1921	3,113
1900	1,158	1911	1,366	1922	3,498
1901	936	1912	1,775	1923	5,247
1902	1,473	1913	1,668	1924	2,882
1903	1,145	1914	1,907	1925	3,709
1904	1,053	1915	2,225	1926	5,221
1905	1,391	1916	1,999	1927	4,085

* Shipments from 1895 to 1920, inclusive, are from north of the Tehachapi only.

Data for 1895 to 1926 from Kaufman, E. E. California crop report for 1926. California Dept Agr. Spec. Pub. 74:21. 1927. For 1927 from preliminary estimates by N. I. Nielsen of the California Cooperative Crop Reporting Service.

INTERSTATE SHIPMENTS OF CALIFORNIA PLUMS IN CARLOTS, 1895–1927

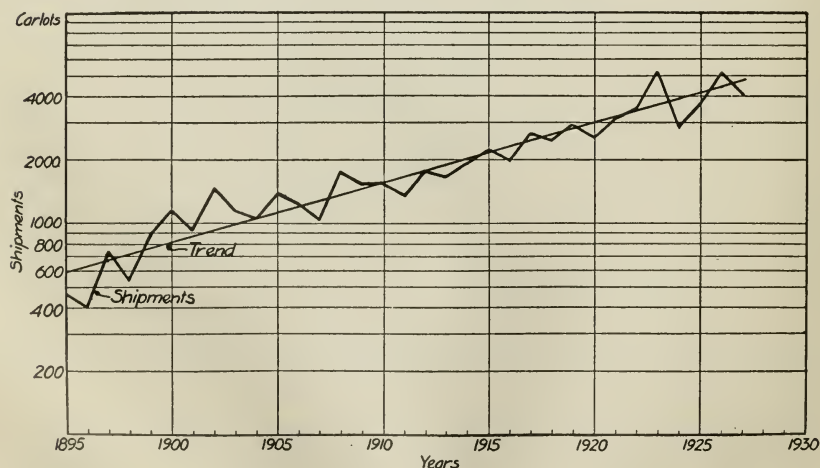


Fig. 2.—In 1900 California shipments first exceeded 1000 carlots while in 1923 they exceeded 5000 carlots. On an average each year increased 6.624 per cent over the preceding year. The equation for the trend line is $\log y = 3.209733 + 0.014045x$. (Data from table 5.)

In 1900 shipments exceeded 1,000 carlots for the first time, and in 1915 they passed the 2,000 mark. More than 3,000 carlots were shipped in 1921 and more than 5,000 in 1923 and 1926.

Neglecting the irregular fluctuations from year to year a steady growth in shipments can be noted. This is shown by the straight line in figure 2, which shows the long-time trend. This indicates an average annual increase for the whole period of 6.624 per cent, i.e., each year the normal shipments were 6.624 per cent greater than the preceding year. Judging by the estimated increases in acreage up to 1930, the trend of shipments will probably continue upward at the same rate for several years more.

TABLE 6

CARLOT SHIPMENTS OF PLUMS IN THE UNITED STATES BY REGIONS, 1920-1927

	California	Oregon, Washington, and Idaho	Rest of United States	Total
1920	2,564	1,812	1,076	5,452
1921	3,113	3,216	159	6,488
1922	3,498	1,991	1,086	6,575
1923	5,247	4,101	446	9,794
1924	2,882	1,730	674	5,286
1925	3,709	2,113	424	6,246
1926	5,221	3,136	540	8,897
1927	4,085	3,068	102	7,255

Data for California are interstate only from Kaufman, E. E. California crop report for 1926. California Dept. Agr. Spec. Pub. 74:21; for 1927 preliminary estimates from N. I. Nielsen of the California Cooperative Crop Reporting Service. Other states from 1920-1926 mimeo. sheets (unpublished) of U. S. Bur. Agr. Econ.; for 1927 from current issues of Crops and Markets.

United States Shipments by Regions.—The total plum shipments in the United States from 1920 to 1927 fluctuated considerably from year to year. In 1920 only 5,452 carlots were shipped compared with 9,794 in 1923 (see table 6). There is no marked trend up or down. California shipments amounted to 48 per cent of the total in 1920 and 1921. The proportion supplied by California increased to 59 per cent in 1925 and 1926. In 1927 California supplied 56 per cent of the total shipments.

Shipments from Oregon, Washington, and Idaho amounted on an average to slightly more than one-third of the United States total shipments. The trend in these states is about on a level.

Shipments from the rest of the United States originate mainly in New York and Michigan. The shipments of plums from these states is declining. In 1920 they supplied nearly 20 per cent of the total

shipments, but in 1926 only 6.1 per cent. Truck shipments have undoubtedly increased during this time but no accurate records of them are available.

United States Shipments by Months.—During the eight-year period from 1920 to 1927 the peak of California plum shipments came in June each year with the exception of 1922 and 1927, when

TABLE 7

CARLOT SHIPMENTS OF PLUMS IN THE UNITED STATES, BY MONTHS, 1926-1927

Months	California*	Oregon, Washington, and Idaho	Rest of United States	Total
1926				
May.....	373		6	379
June.....	2,649		9	2,658
July.....	1,857	155	3	2,015
August.....	333	1,694	12	2,039
September.....	9	1,279	337	1,625
October.....		8	173†	181
Total.....	5,221	3,136	540	8,897
1927				
May.....				
June.....	1,314		20	1,334
July.....	1,840		4	1,844
August.....	926	969	6	1,901
September.....	5	1,940	55	2,000
October.....		159	17	176
Total.....	4,085	3,068	102	7,255

* Data for California compiled from California Fruit News, current issues 1926, 1927. Slight adjustments in monthly shipments were made to make totals check with California Crop Report totals.

† This figure contains 5 carlots shipped in November.

Data, except for California, compiled from Crops and Markets, current issues.

it came in July. In table 7 and in figure 3 data for 1926 are somewhat more typical of the distribution of shipments by months than those for 1927. In 1926, 2,649 carlots or approximately one-half of California plum shipments for the year came in June, slightly over one-third in July. August and May shipments were 333 and 373 carlots, respectively.

Nearly all of the plums shipped in the United States in May, June, and July came from California. In August and September the shipments from Oregon, Washington, and Idaho comprised more than 80 per cent of the total United States shipments in 1926 and slightly more than one-half in 1927, in spite of the late season in California.

Shipments from the rest of the United States reached their peak in September in both years, but made up only a small part of the total for any month.

MONTHLY CARLOT SHIPMENTS OF PLUMS IN THE UNITED STATES, 1926-1927

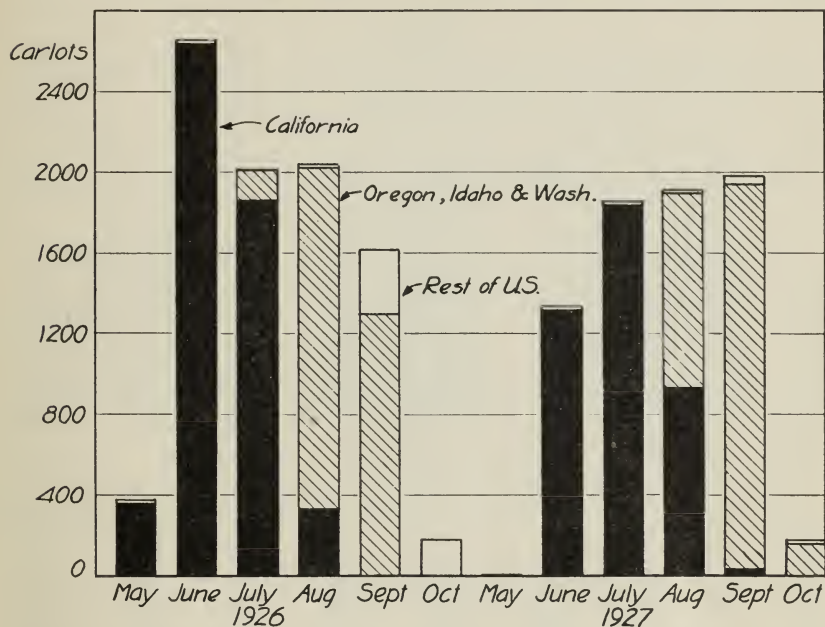


Fig. 3.—Nearly all of the plums shipped in the United States during May, June, and July come from California. In August more than one-half of the total come from Oregon, Idaho, and Washington. The September shipments largely come from these three states. (Data from table 7.)

COMPETITION WITH OTHER FRUITS

Large quantities of a variety of fruits are shipped during the months of June, July, and August when plum shipments from California are important. Those which are of considerable importance in competing with plums and are seasonal in their movements are shown in table 8 and figure 4. The general trend of shipments of all fruits is upward. No data are given for mixed deciduous fruits during 1920 and 1921. Some plums are included in this class of fruits, shipments of mixed deciduous fruits from California being estimated as consisting of 40 per cent plums.⁵

⁵ Estimate of O. W. Holmes, State Department of Agriculture.

During the month of June plum shipments averaged 1,099 carlots, slightly less than 7 per cent of the 16,213 carlots—the average June Shipments of all of the fruits shown in table 8. In July the carlot shipments of plums averaged 3.5 per cent of all the fruits, and in August slightly over 4 per cent.

TABLE 8

CARLOT SHIPMENTS OF SPECIFIED FRESH FRUITS IN THE UNITED STATES, FOR
JUNE, JULY, AND AUGUST, 1920-1927

Year	Plums	Mixed deciduous	Apples	Pears	Cantaloupes	Peaches	Total
JUNE							
1920.....	778	.....	262	.....	6,700	1,550	9,290
1921.....	1,126	.....	436	.....	7,900	4,000	13,462
1922.....	486	821	1,117	460	10,371	3,184	16,439
1923.....	1,114	2,213	509	1,114	10,193	2,384	17,527
1924.....	829	1,134	912	228	11,862	1,873	16,838
1925.....	1,332	1,040	942	.....	10,078	4,951	18,343
1926.....	2,141	895	1,205	.....	6,239	2,209	12,689
1927.....	982	722	1,202	.....	11,512	5,409	19,827
JULY							
1920.....	1,055	.....	1,855	2,677	5,451	6,900	17,938
1921.....	943	.....	1,207	1,694	8,669	9,300	21,813
1922.....	1,291	1,862	2,592	1,659	10,173	7,541	25,118
1923.....	938	2,543	3,360	3,973	6,043	10,963	27,820
1924.....	605	1,598	2,362	2,887	8,311	14,603	30,366
1925.....	882	1,776	2,895	3,929	9,737	17,932	37,151
1926.....	1,330	1,888	3,840	6,237	6,949	21,709	41,953
1927.....	1,256	938	1,731	2,296	9,656	12,938	28,815
AUGUST							
1920.....	680	.....	3,861	3,367	7,388	6,326	21,622
1921.....	1,307	.....	3,384	5,615	6,067	7,381	23,754
1922.....	980	3,137	4,923	6,992	5,334	11,924	33,290
1923.....	1,610	2,331	4,122	5,400	4,991	9,757	28,211
1924.....	1,131	1,481	3,126	4,744	4,592	13,781	28,855
1925.....	1,358	2,297	4,330	6,833	6,567	9,921	31,356
1926.....	1,842	2,267	3,388	7,678	5,574	24,529	45,278
1927.....	1,412	2,047	3,352	6,914	5,042	13,015	31,782

Data from Crops and Markets, Monthly Supplements, current issues, 1924-1927. No data on mixed deciduous fruit until 1922.

Peach shipments in July and August showed the most rapid increase of all of the fruits during the period 1920 to 1927. The last four years showed almost a 100 per cent increase over the first four years.

CARLOT SHIPMENTS OF SPECIFIED FRESH FRUITS IN THE UNITED STATES

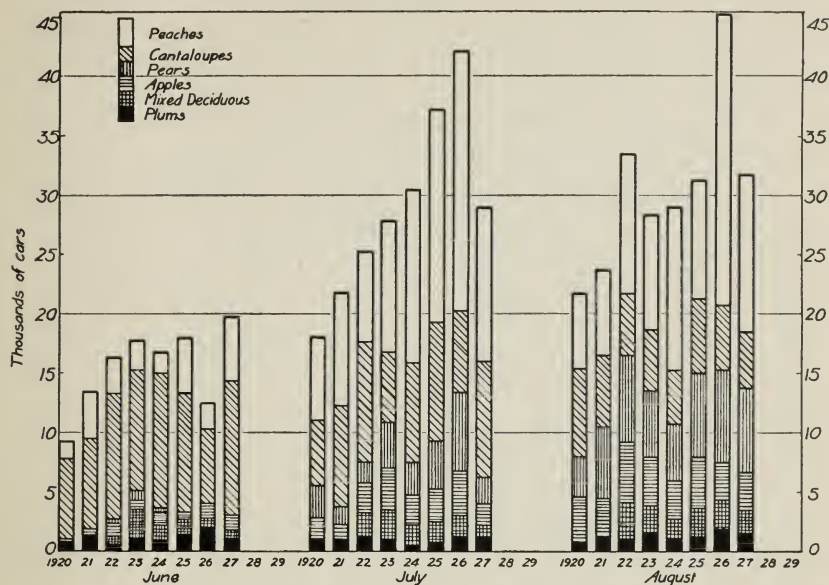


Fig. 4.—Large quantities of other fruits are shipped during the three months when most of the California plums are marketed and the trend of these is upward. (Data from table 8.)

CANNED PLUMS ⁶

Most of the canned plums in the United States come from California. Michigan, New York, Oregon, and Washington can comparatively small quantities of them. The quantities canned in California from 1906 to 1926 and the proportion which they make up of the total crop in the state are shown in table 9. The quantities canned vary widely from year to year. Thus in 1908 270,000 cases were canned while in 1909 the number dropped to 103,000. The trend of total quantities canned from 1906 to 1926 is slightly upward. For the first ten years, 1906 to 1915, the average annual pack was 155,883 cases, and for the last ten years, 1917 to 1926, it was 184,999. The increase in canned plums has not been as rapid as the shipments (see table 5) and hence the proportion of the total crop that is canned seems to be declining as shown by the last column of table 9. With the exception of the first year in which this proportion is shown, 1919, the canned plums comprised from 4 to 8 per cent of the total crop.

⁶ For a discussion of the varieties canned, and the possibilities of using plums in other ways see Cruess, W. V. The utilization of surplus plums. California Agr. Exp. Sta. Bul. 400:1-21. 1926.

TABLE 9

QUANTITY AND PROPORTION OF CALIFORNIA PLUM CROP CANNED, 1906-1927

1906-1916		1917-1927				
Year	Canned plums	Year	Canned plums		Total production fresh (tons)	Proportion† canned to total production per cent
	Thousands of cases		Thousands of cases	Equivalent fresh* (tons)		
1906	224	1917	270			
1907	170	1918	149			
1908	270	1919	280	4,667	42,000	11.1
1909	103	1920	165	2,750	35,000	7.9
1910	95	1921	141	2,350	42,000	5.6
1911	188	1922	182	3,033	48,000	6.3
1912	202	1923	164	2,733	69,000	4.0
1913	79	1924	91	1,517	39,000	3.9
1914	131	1925	179	2,983	51,000	5.8
1915	95	1926	229	3,817	71,000	5.4
1916	85	1927	137	2,287	57,000	4.0

* 60 cases canned plums equal one ton fresh.

† Proportion of canned to total production obtained by dividing the fresh equivalent of canned plums, by the total production.

Data compiled from Kaufman, E. E. California crop reports for 1925 and 1926. California Dept. Agr. Spec. Pub. 63:26. 1926; and 74:23. 1927.

PRICES OF PLUMS

Seasonal Variations.—California plums are sold on the New York market for a period of from twelve to fifteen weeks. As a rule prices start at a high point at the beginning of the season as limited quantities of the early varieties come on the market. As the quantities increase, prices of the early varieties decline rapidly and continue to go down after the quantities of these varieties decline (see table 10). The later varieties coming on the market are usually of better quality and bring higher prices.

The Beauty plum was first on the market in 1926, and brought an average of \$2.23 a crate the first week ending June 4. The following week, with increased receipts, the price dropped to \$1.39. During the next two weeks receipts fell off, but prices continued to decline. The Formosa plums experienced one exception to this trend in the third week, when prices recovered temporarily with a decline in receipts. The Tragedy plum came on in large quantities the fourth week of the season and brought better prices than the early varieties which were brought into competition with it. Still later varieties like the Kelsey and President generally brought good prices late in the season. The total volume of sales at New York of the eleven varieties

shown in table 10 equals approximately 13 per cent of the total plum shipments from California in 1926, and hence constitute a fair sample of the crop.

A fairly representative picture of the seasonal movement at New York can be obtained by averaging for all of the first weeks, second weeks, etc., during the period 1921 to 1927, the sales and prices of the five important varieties, viz., the Burbank, Climax, Diamond, Grand Duke, and Tragedy. These are shown in table 11 and figure 5. The

TABLE 11

AVERAGE QUANTITIES OF FIVE VARIETIES OF PLUMS* SOLD AT NEW YORK BY WEEKS [OF THE SEASON] AND PRICES OBTAINED, 1921-1927

Week of the season	Sales		Price	
	Number of crates	Per cent of average	Dollars	Per cent of average
1.....	2,870	12.3	2.13	128.3
2.....	20,458	87.9	1.72	103.6
3.....	49,618	213.1	1.73	104.2
4.....	58,003	249.1	1.51	91.0
5.....	42,080	180.7	1.66	100.0
6.....	34,269	147.2	1.69	101.8
7.....	26,938	115.7	1.64	98.8
8.....	18,179	78.1	1.76	106.0
9.....	21,481	92.2	1.66	100.0
10.....	17,397	74.7	1.46	88.0
11.....	7,903	33.9	1.45	87.3
12.....	2,817	12.1	1.54	92.8
13.....	724	3.1	1.64	98.8
Average.....	23,287	100.0	1.66†	100.0

* Includes Burbank, Climax, Diamond, Grand Duke, and Tragedy plums.

† Unweighted average. The weighted average is \$1.64.

Data for 1921-1924 compiled from summaries of the Stewart Fruit Co. taken from New York Daily Fruit Reporter, current issues; for 1925-1927 from Hansen, Carl J. Market News Service U. S. Dept. Agr. and California Dept. Agr. Mimeo. reports from San Francisco, current issues.

latter also shows total weekly shipments of plums from California for the same period.

The quantities sold increased during the first four weeks while the price declined. For the rest of the season the volume of sales declined somewhat irregularly. The marked decline in sales in the eighth week was accompanied by a slight recovery of prices which declined again as sales increased. Toward the end of the season the quantities sold fell off greatly, and the prices made a moderate recovery. Shipments, which included all varieties, increased up to the fifth week, after which there was practically a steady decline to the end of the season.

COMPARISON OF WEEKLY SHIPMENTS OF PLUMS FROM CALIFORNIA AND WEEKLY AUCTION SALES OF FIVE VARIETIES AT NEW YORK, AVERAGE 1921-1927

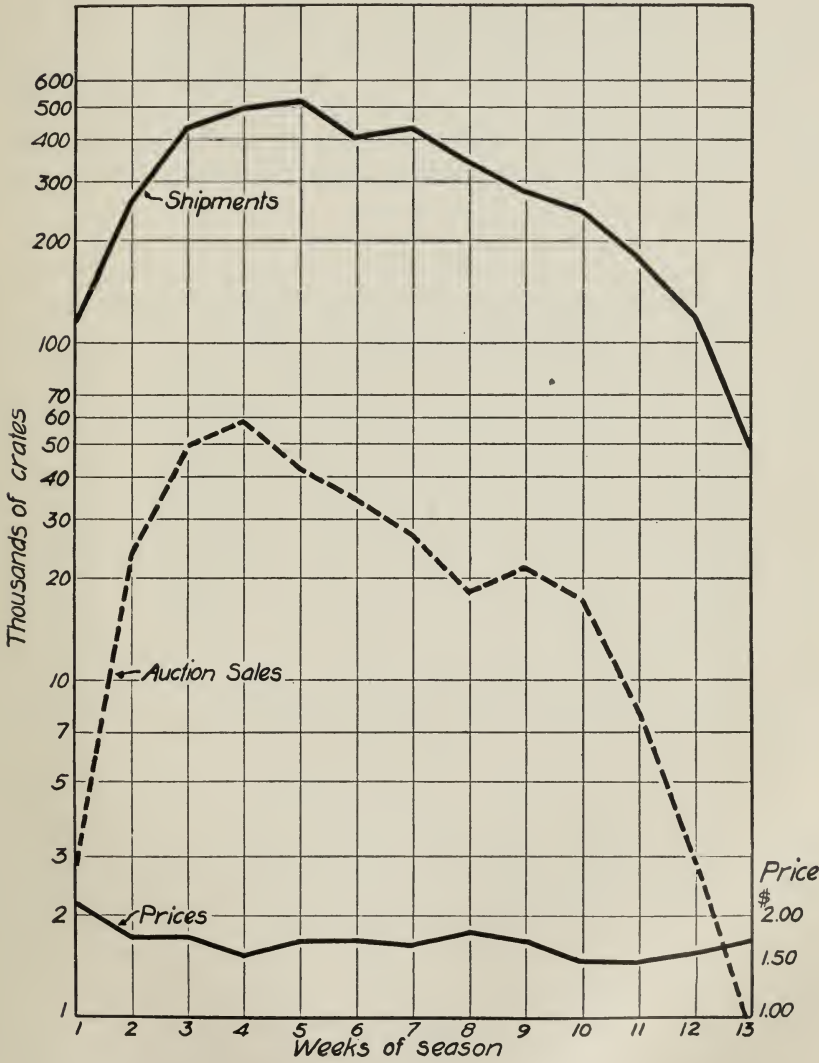


Fig. 5.—Volume of sales of Burbank, Climax, Diamond, Grand Duke, and Tragedy plums at New York are approximately proportional to shipments throughout the season. The price trend is downward as the season advances with some recovery as the later varieties arrive, and as supplies become very short. (Data from table 12.)

Prices by Varieties.—There is considerable variation in the average price which the different varieties of plums bring on the New York market, and the rank based on price often changes from season to season. There is no certainty, therefore, that the variety which has brought the highest price for one or more years will continue to bring the highest price. It is of some interest, however, to compare the prices which eleven of the important varieties of California plums have brought during the last three seasons, 1925–1927. Table 12 shows the simple averages of the weighted annual prices of these varieties arranged in order from highest to lowest, with the earliest and latest dates of sales.

TABLE 12
AVERAGE PRICES OF PLUMS AT NEW YORK, 1925–1927, BY VARIETIES AND
EARLIEST AND LATEST DATES OF SALE

Rank	Variety	Average price	Earliest date	Latest date
1	Kelsey.....	\$2.25	July 17	Sept. 4
2	Wickson.....	1.96	June 25	Aug. 12
3	President.....	1.87	July 30	Sept. 15
4	Beauty.....	1.72	May 27	July 8
5	Formosa.....	1.70	June 4	July 15
6	Diamond.....	1.67	July 3	Aug. 26
7	Tragedy.....	1.66	June 11	Aug. 12
8	Burbank.....	1.54	June 16	Aug. 12
9	Santa Rosa.....	1.50	June 4	Aug. 19
10	Grand Duke.....	1.45	July 16	Sept. 10
11	Climax.....	1.45	June 4	July 15

Data compiled from Hansen, Carl J. Market News Service. U. S. Dept. Agr. and California Dept. Agr. Mimeo. reports from San Francisco, current issues.

The three highest varieties, Kelsey, Wickson, and President are medium or late varieties. The fourth and fifth (Beauty and Formosa) are among the earliest. Prices have been compiled since 1917 on the Diamond, Tragedy, Burbank, Grand Duke, and Climax and are shown in table 13. The records over the longer period, 1917 to 1927, show that the Tragedy has usually brought a higher price than the diamond. The Grand Duke ranks higher and the Burbank lower for the eleven-year period than for the last three years.

In choosing a variety for planting, however, other factors besides the price of the past three years or the past eleven years must be considered. Some of these factors are:

1. The adaptability of the variety to the region. There would be no advantage in trying to grow an early variety in the cooler parts of the plum-growing area.

2. The cost of production per crate depends largely upon the yield per acre. Some of the varieties yield more heavily than others and hence can be produced at lower costs per crate.

3. Some varieties are self-sterile or inter-sterile and hence must be planted with varieties which will bring about proper fertilization. The work of Professor Hendrickson of this station gives detailed information on this point.⁷

4. A combination of varieties which will distribute the labor evenly over a long period of time is usually advantageous in an orchard.

Prices and Quantities Sold.—There is a fairly consistent relationship between the quantities of plums sold from year to year and the average price obtained for them. For the first four years of the period 1917 to 1927 this relationship is not so evident because of the fact that the general price level was changing considerably and was unusually high during this period compared with the price-level from 1921 to 1927. In order to have the prices of plums comparable from year to year they were adjusted for these changes in the price level by dividing the annual prices by the corresponding July index number of all commodities, compiled by the United States Bureau of Labor Statistics. This index number as given in the source (see footnote to table 13) is calculated relative to the 1910 to 1914 period taken as equal to 100. The price level in 1927 was approximately 50 per cent above the 1910 to 1914 base, hence the prices after being divided by the corresponding index number were multiplied by 1.5 which adjusts them all approximately to the 1927 price level. These adjusted prices are shown beside the actuals in table 13 and are charted with sales in figure 6.

During seasons when large quantities were sold low prices usually prevailed, and, with the exception of the first three years, in seasons during which small quantities were sold high prices prevailed. Thus in 1923 and 1926 large quantities resulted in low prices per crate, and in 1921, 1924, and 1927 small quantities of all varieties resulted in high prices. The coefficient of correlation between quantities and prices varies from -0.3 to -0.6 for the individual varieties and amounts to -0.8 for all five varieties. Perfect inverse correlation would be indicated by -1.0 .

⁷ Hendrickson, A. H. Plum pollination. California Agr. Exp. Sta. Bul. 310:1-28. 1919.

Further experiments in plum pollination. California Agr. Exp. Sta. Bul. 352:247-266. 1922.

TABLE 13

AUCTION SALES AT NEW YORK, ACTUAL AND ADJUSTED PRICE OF FIVE VARIETIES
OF PLUMS, 1917-1927

Year	Diamond			Grand Duke			Climax		
	Crates	Actual price	Adjusted* price	Crates	Actual price	Adjusted* price	Crates	Actual price	Adjusted* price
1917	44,891	\$1.37	\$1.08	56,184	\$1.41	\$1.11	56,516	\$1.38	\$1.08
1918	18,360	1.94	1.45	31,765	1.96	1.47	53,489	1.60	1.20
1919	25,020	2.08	1.45	37,430	1.80	1.25	65,412	1.83	1.27
1920	14,985	2.57	1.57	26,732	2.50	1.53	47,245	2.62	1.60
1921	28,575	2.38	2.49	33,090	2.06	2.15	78,155	1.37	1.43
1922	34,130	1.38	1.31	60,795	1.44	1.37	80,765	1.39	1.32
1923	68,650	1.17	1.14	77,620	1.31	1.28	89,280	1.63	1.59
1924	30,165	1.68	1.68	42,010	1.85	1.85	46,355	1.91	1.91
1925	36,500	1.82	1.68	59,500	1.34	1.23	57,500	1.56	1.44
1926	31,065	1.48	1.45	88,360	1.37	1.39	81,760	1.28	1.25
1927	57,900	1.70	1.73	58,695	1.64	1.67	39,420	1.50	1.53

	Tragedy			Burbank			Total or average		
	Crates	Actual price	Adjusted* price	Crates	Actual price	Adjusted* price	Crates	Actual price	Adjusted* price
1917	144,484	\$1.45	\$1.14	28,497	\$1.46	\$1.15	330,572	\$1.42	\$1.11
1918	50,865	2.01	1.51	31,727	1.82	1.37	185,206	1.85	1.39
1919	86,705	1.90	1.32	37,055	1.73	1.20	251,622	1.86	1.29
1920	60,030	2.58	1.58	29,819	2.25	1.38	178,811	2.52	1.54
1921	56,665	1.92	2.01	35,795	1.46	1.53	231,680	1.74	1.81
1922	74,055	1.75	1.67	40,800	1.15	1.09	290,545	1.46	1.38
1923	140,763	1.32	1.29	67,024	1.08	1.06	443,337	1.32	1.29
1924	55,030	2.14	2.14	27,565	1.82	1.82	201,125	1.91	1.91
1925	96,000	1.69	1.56	37,500	1.52	1.40	287,000	1.59	1.47
1926	128,020	1.50	1.47	35,295	1.34	1.31	364,500	1.39	1.36
1927	105,131	1.79	1.82	43,568	1.76	1.79	304,714	1.70	1.74

* The adjusted price was obtained by dividing the actual price of each year by the U. S. Bureau of Labor Statistics all-commodity index number for July of the same year and multiplying the quotient by 1.5. This brings the adjusted price approximately in terms of the 1927 price level. The source of the index number used is U. S. Bur. Agr. Econ. Index numbers of farm prices (mimeo.) pp. 60-63. Jan., 1928.

Data for 1917-1924 compiled from summaries of the Stewart Fruit Co. taken from the New York Daily Fruit Reporter, current issues; for 1925-1927 from Hansen, Carl J. Market News Service U. S. Dept. Agr. and California Dept. Agr. Mimeo. reports from San Francisco, current issues.

The trend in quantities sold at New York is upward as one would expect from a study of the shipments from California shown in table 5. The trend of prices seems to be upward during this period, 1917 to 1927, but it must not be assumed that this is a part of a long upward trend which is likely to continue for some time in the future. Fragmentary data on plum prices back to 1913 indicate fairly high prices at that time followed by a slump which reached its low point

DELIVERED AUCTION SALES OF CALIFORNIA PLUMS BY VARIETIES AT NEW YORK, 1917-1927

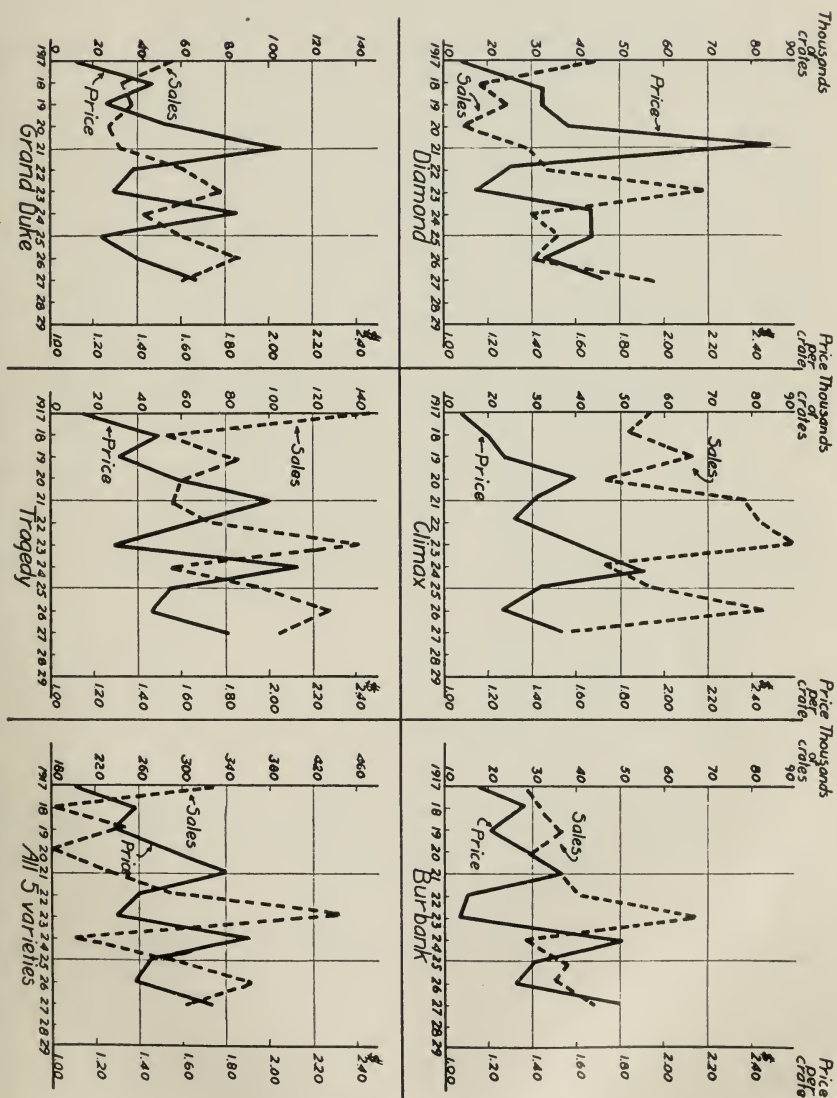


Fig. 6.—The price trend (adjusted for changes in the price level) has been about on a level since 1920. Large sales usually go with low prices and low sales with high prices especially in the totals of five varieties. (Data from table 13.)

in 1917. The following two or three years were marked by a recovery. Since 1920 and 1921 the line of trend seems to be approximately on a level.

Since plums make up but a small proportion of the fruit available during June, July, and August some may reason that even a large percentage increase in the supply of plums will have little effect on their price, since the total supply of fruit will be affected very little thereby. A preliminary study of past experience, however, indicates that plum prices are affected mainly by the supply of plums rather than by the supply of all other fruits available at that time. Although the demand for plums has increased to some extent, as is shown by the fact that the price trend since 1920 has not fallen appreciably with the increase in quantities sold, this increase in demand has developed gradually. How long it will continue to increase cannot be predicted now. It does not seem likely that the demand in the next three years will increase faster than the bearing acreage in California (see p. 10), hence the trend in prices is not likely to be upward.

Net Prices to Growers.—Tables worked out by Hansen and Holmes⁸ show approximately the cost to the grower of shipping his plums to New York and selling them. The charges to be deducted from the New York price per crate in order to obtain the net price are as follows:

Crates, packing, and loading.....	\$0.38
Cartage: ranch to station.....	.03
Freight and icing.....	.55
Sales commission (7 per cent on \$1.56).....	.11
Total.....	\$1.07

The average price per crate at New York from 1922 to 1927 for the five varieties shown in table 13 was \$1.56. Subtracting \$1.07 leaves a net price of \$0.49 for the grower.

⁸ Hansen, C. J., and O. W. Holmes. Marketing California plums and prunes season 1926. U. S. Bur. Agr. Econ. and California Dept. Agr. Mimeo. Report. p. 34.

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